Remarks

Claims 1-35 are in the application. Claims 1, 20, and 32 are in independent form. Claims 20-31 have been allowed.

Claims 1, 2, and 6-10 are rejected under 35 U.S.C. 102(b) for anticipation by Dhuler (US Pat. no. 5,994,816), and claims 4, 5, 11-18 are rejected under 35 USC 103(a) for obviousness over Dhuler. Claims 3, 9, and 19 are objected to as being dependent on rejected base claims, but would be allowable if rewritten in independent form. Applicant notes that claim 5 is indicated as being allowable on the Office Action Summary, but the body of the Office Action makes clear that clear 3, rather than claim 5, is allowable. Applicant responds as follows.

Claim 1 has been amended to recite the subject matter of allowable claim 3, which has been cancelled. Allowable claim 19 has been amended to delete the subject matter incorporated into claim 1.

Amended claim 1 recites a floating cold beam in a manner analogous to that in which the floating cold beam is recited in allowed claim 20. Claim 1 has not been amended to include the subject matter of intervening dependent claim 2. Applicant submits that amended claim 1 is patentably distinct from the cited reference for the following reasons.

Amended claim 1 includes subject matter recited in allowed claim 20, and also recites additional features, including an in-plane shuttle floating on the substrate for motion parallel to the planar substrate. Applicant submits that amended claim 1 is patentably distinct from the cited reference at least for the reasons that claim 20 is also allowable. Applicant requests, therefore, that the rejection of claim 1 and its dependent claims be withdrawn.

Added claim 32 recites in independent form the subject matter of original claims 1 and 12. In particular, claim 32 recites the thermal microelectrical mechanical actuator of original claim 1, with the added feature that the thermal half-beams are tapered from their centers toward their ends. Added dependent claim 33 corresponds to original claim 13. Applicant submits that claims 32 and

33, which correspond to rejected original claims 12 and 13, are patentably distinct from the cited reference for the following reasons.

In the rejection of original claims 12 and 13, the Examiner states that even though Dhuler does not disclose different shapes for the thermal beams, different shapes would have been obvious "for the purpose of achieving appropriate power output." Applicant submits that the cited art provides to teaching or suggestion of "different shapes" for the thermal beams and, in particular, for thermal beams with the recited tapered configurations.

Dhuler describes an actuator that, in one embodiment, includes a "latch means" to latch an actuator into position after actuation to reduce power requirements. (Dhuler, col. 4, lines 41-55.) Dhuler makes no suggestion or mention of varying the shape of thermal beams, and specifically does not even hint at the recited tapered configuration, "for the purpose of achieving appropriate power output."

Benefits provided by the recited configuration of thermal beams are described in the application as follows:

> The tapered configuration of thermal half-beams 226 and 228 decreases the tendency to flex out-of-plane and increases their current carrying capacity. With uniform-sized (i.e., un-tapered) half-beams, the anchors (e.g., 182 and 184) and shuttle (e.g., 194) function as thermal heat sinks that keep the ends of the beams at a lower temperature than the centers when current is passed through the half-beams to impart thermal expansion. As the current is increased, the centers of uniform-sized half-beams get hotter, sometimes until material deformation or decomposition causes failure of the actuator.
>
> The tapered configuration of thermal half-beams 226 and 228 minimizes temperature difference characteristic of uniform-sized half-beams, thereby improving temperature uniformity along half-beams 226 and 228 and allowing thermal expansion effects to be maximized. It will be appreciated that the increased in-plane width of thermal half-beams 226 and 228 at their centers functions to both reduce electrical resistance (and hence the I^2R heat losses) and to increase the thermal mass in the center. Keeping thermal half-beams 226 and 228 thin or narrow at their ends minimizes the force required to bend thermal half-beams 226 and 228 when they expand to displace or move shuttle 234. (Application page 15, paragraphs 56 and 57.)

Dhuler describes use of a latch means to reduce power requirements and makes no mention of thermal beam configuration relating to "achieving appropriate power output." Applicant submits, therefore, that the cited reference lacks any teaching or suggestion to use any "different shapes" for the thermal beams, much less the specific tapered configurations recited in the claims. Applicants submit that claims 32 and 33 are patentably distinct from the cited references and request that the claims be allowed.

Applicant believes the application is in condition for allowance and respectfully requests the same.

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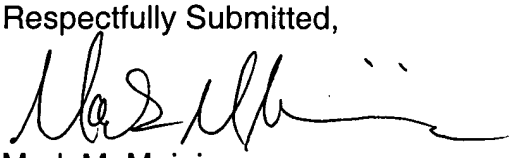
Respectfully Submitted,



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